Haiyu WANG

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EDUCATION

B.Eng., Communication Engineering, Southern University of Science and Technology, Shenzhen, China

- Time: Sept. 2020 ~ Jun. 2024 (Expected)
- Supervisor: Terry Ye, Professor
- Overall GPA: 3.69/4.0 Major GPA: 3.84/4.0 Rank: 11/36

M.Eng., Electrical Engineering and Information Systems, The University of Tokyo, Tokyo, Japan

- Time: Oct. 2024 (Expected) ~ Sept. 2026 (Expected)
- Supervisor: Takao Someya, Professor

PUBLICATION & PATENT

- [Published & Oral Presentation] Yang, Hongjia., Xu, Jiarui., **Wang, Haiyu**., Wen, Chaofan. & Wu, Guang. Implementation of Anti-quantum Communication System using Software-Defined Radio. in *2023 IEEE International Conference on Consumer Electronics (ICCE)* 1–6, 2023
- [Accepted] Wu, Kehan.*, Chen, Renqi.*, **Wang, Haiyu**., Ji, Chenqing., Zhu, Jiayuan. & Wu, Guang. Human Respiration Detection Under Interference: Challenges and Solutions. in *2024 IEEE Wireless Communications and Networking Conference (WCNC)* 1-6, 2024
- [Patent Pending] **Wang Haiyu.** Automatic Measurement System for Penetration Depth during Laser Welding Process.

RESEARCH EXPERIENCE

My research interests include Internet of Things (IoT), Radio Frequency Identification (RFID), flexible electronics and Computer Vision (CV). I have been working as a research assistant in the IoT and Microsystems Lab under Prof. Terry Ye and a member of the team of Dr. Guang Wu for more than one year. These experiences have greatly motivated me to become a self-learning and self-disciplined researcher. My research projects include:

RFID-based Non-destructive Timber Structural Inspection (Project Leader) **Jan. 2023 ~ Present**

- Led a project on detecting internal defects and abnormal structures in timbers, such as wormholes or nails.
- Designed and implemented an RFID tag array attached to the timber, utilizing an antenna to receive the RSSI from each tag.
- Developed a test platform and wrote a program to process the collected data.
- Currently, writing a paper on this topic.

Integrated Battery-Free Sensor with Active RFID Tag (Project Co-Leader) **Apr. 2023 ~ Present**

- Collaborated on a project that explores the use of fruits as a power source to activate active RFID tags, replacing conventional batteries.
- Utilized EM4325 as the RFID IC and BQ25504 as the DC-DC booster, achieving an extended sensing distance and measuring the output power.
- Proposed the use of a booster to meet the working requirements of EM4325 (BAP Enable Mode) and design the energy storage and management circuits.

Human Respiration Detection and Gesture Recognition Based on mmWave ISAC System **Jan. 2023 ~ Jul. 2023**

- Two teammates and I proposed a new method of detection and counting of human respiration under interference based on communication system combining with USRP 2954R and Sivers Array Antenna to improve service life and flexibility of IoT devices with device-free respiration monitoring (DFRM).
- Participated in the experiment design and conduction and improved the performance of the system with machine learning techniques.
- Co-authored paper has been accepted by IEEE Wireless Communications and Networking Conference (WCNC).

Anti-quantum Communication System Based on Software-Defined Radio **Mar. 2022 ~ Jul. 2023**

- Three teammates and I proposed a new implementation of anti-quantum communication system combining with SDR AD9361 and FPGA to improve service life and flexibility of IoT devices with limited resources on the basis of ensuring their security.
- Improved the performance of "Rainbow" anti-quantum digital signature algorithm. In addition, I recorded the data and analyzed the performance of the communication system.
- Deployed the "Rainbow" algorithm on a low-consumption IoT platform, Hi3861, to ensure secure data access.
- Co-authored paper has been published on 2023 IEEE International Conference on Consumer Electronics (ICCE). And we were invited for oral presentation.

CURRICULAR PROJECT

LTE Transceiver and Image Transmission **Design of Modern Communication Systems, Score: 98**

- Built an LTE communication system on USRP N210, and successfully transmitted an Image.
- Implemented data encapsulation, signal modulation, collision detection and demodulation following the standards of LTE.

Gesture recognition for Human-Computer Interaction (HCI) **C/C++ Program Design, Score: 96**

- Developed a gesture recognition system using OpenCV (C++) based on convex hull detection.
- Achieved efficient human-computer interaction such as cursor control and some shortcuts.
- GitHub address: https://github.com/Smangic/SUSTech_CS205_2022_HCI

Simulation of Cell Life with Quadtree Structure **Data Structure and Algorithm, Score: 100**

- Orchestrated a simulation of cellular life using Quadtree algorithms, balancing the addition, search, and deletion of cells. And different kinds of cells are different in size and moving patterns, and their behaviors will be influenced by their surroundings.
- Optimized the simulation of 10,000 cells to run at 15fps without graphics and 3,000 cells at 15 fps with a full real-time GUI.
- GitHub address: https://github.com/Smangic/DSAA-B-Final-Project

Laser Keyboard **Analog Circuits Laboratory, Score: 98**

- Designed and implemented a laser keyboard using a commercial keyboard-shaped laser projector and common camera.
- Utilized OpenCV (Python) to achieve finger localization for interaction based on contour detection.
- GitHub address: https://github.com/Smangic/Laser-keyboard

INTERNSHIP EXPERIENCE

City University of Hong Kong, Department of Biomedical Engineering **Jul. 2023 ~ Aug. 2023**

- Worked as research assistant under the guidance of Assoc. Prof. Xinge Yu.
- Participated in the research of wireless gesture recognition with passive RFID tattoo.

Chengdu Neton Optoelectronic Technologies Co., Ltd. **Mar. 2023 ~ Jun. 2023**

- Online research and development of automatic measurement system for penetration.
- Goal is to measure and record the penetration during laser welding process by Computer Vision (OpenCV, Python).
- Achieved a satisfying detection precision with test samples. The outcomes met the requirement of my employer.
- The whole system was under testing, and the patent is pending.

HONOR

- 2023 Challenge Cup (Chinese College Students of Academic Science and Technology "Olympic"), Guangdong Province, Silver Award
- 2023 SUSTech Merit Student Scholarship, Third Prize
- 2023 National Contest of Chip Application, Southern Division of China, Bronze Award
- 2022 SUSTech Merit Student Scholarship, Second Prize
- 2021 SUSTech Merit Student Scholarship, Third Prize

ADDITIONAL INFORMATION

- Language: IELTS 6.5
- Peer Counselor of Class 13, Zhicheng Residential College.
- Teaching assistant of course Fundamentals of Electric Circuit 2022.
- Member of Organization Department of the Youth League Committee of Zhicheng Residential College, SUSTech.
- Taught review lessons of Analog Circuits, Communication Principles and Engineering mathematics at school. Recordings have got over 1500+ views in my personal bilibili channel.
- Skilled in
  - Programming languages: Python (3 years), Java (3 years), MATLAB (2 years), C/C++ (1 year)
  - Software: LaTeX (2 years), Markdown (2 years), LabVIEW (1 year), ANSYS Electronics Desktop (1 year), VIVADO (1 year), ItemTest (1 year), Blender (beginner)